

InterDec: The potential of seasonal-to-decadal-scale inter-regional linkages to advance climate predictions

Call: Climate Predictability and Inter-Regional Linkages

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Globally averaged surface air temperature (SAT) during the 20th and 21st centuries displays a gradual warming and superimposed year-to-year and decadal-scale fluctuations. The upward trend contains the climate response to an anthropogenic increase of heat trapping atmospheric greenhouse gases. The temperature ups and downs around the trend - that are particularly pronounced in the Arctic - mostly reflect natural variability. Natural climate variations are of two types, internal and external. The former is produced by the climate system itself, e.g. due to variations in ocean circulation. An example of the latter is solar-induced climate variability. Decadal-scale variability is of large societal relevance. It is observed, for example, in Atlantic hurricane activity, Sahel rainfall, Indian and East Asian Monsoons, Eurasian winter coldness and in the Arctic SAT and sea ice.

The understanding and skillful prediction of decadal-scale climate variability that modulates the regional occurrence of extreme weather events will be of enormous societal and economic benefit. InterDec is an international initiative aiming at understanding the origin of decadal-scale climate variability in different regions of the world and the linkages between them by using observational data sets and through coordinated multi-model experiments.

How can a decadal-scale climate anomaly in one region influence very distant areas of the planet? This can happen through atmospheric or oceanic teleconnections. Fast signal communication between different latitudinal belts within days or weeks is possible through atmospheric teleconnection, whereas communication through oceanic pathways is much slower requiring years to decades or even longer. Understanding these processes will enhance decadal climate prediction of both mean climate variations and associated trends in regional extreme events. Scientists from different European countries, from China and Japan will closely collaborate to disentangle the secrets of the inter-relations of decadal-scale variability around the globe.